

DAFTAR PUSTAKA

1. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans F, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012; 380:2095–128.
2. Blachier M, Leleu H, Peck-Radosavljevic M, Valla DC, Roudot-Thoraval F. The burden of liver disease in Europe: a review of available epidemiological data. *J Hepatol* 2013;58: 593–608.
3. Hoyert DL, Xu J. Deaths: preliminary data for 2011. *Natl Vital Stat Rep*. 2012;61:1-52.
4. Perhimpunan Peneliti Hati Indonesia. Sirosis Hati. www.PPHI-ONLINE.ORG. 2013 [cited 2015 15-12].
5. Hernandez-Gea V, Friedman S.L. Pathogenesis of liver fibrosis. *Annu Rev Pathol*. 2011;6:425-256.
6. Asrani SK, Larsson JJ, Yawn B, Therneau TM, Kim WR. Underestimation of liver-related mortality in the US. *Gastroenterology*. 2013; 145:375-82.
7. Zhao J, Zhang Z, Luan Y, Zou Z, Sun Y, Li Y, et al. Pathological functions of interleukin-22 in chronic liver inflammation and fibrosis with hepatitis B virus infection by promoting T helper 17 cell recruitment. *Hepatology*. 2014; 59:1331–42.
8. Friedman SL. Mechanisms of hepatic fibrogenesis. *Gastroenterology*. 2008; 134:1655–69.

9. Kisseleva T, Brenner DA. Hepatic stellate cells and the reversal of fibrosis. *J Gastroenterol Hepatol*. 2006; 21:S84–S7.
10. Benyon RC, Arthur MJ. Extracellular matrix degradation and the role of hepatic stellate cells. *Semin Liver Dis*. 200; 21:373-84
11. Shi GF, Li Q. Effects of oxymatrine on experimental hepatic fibrosis and its mechanism in vivo. *World J Gastroenterol*. 2005;11:268-71.
12. Benyon RC, Iredale JP, Goddard S, Winwod PJ, Arthur MJ. Expression of tissue inhibitor of metalloproteinases 1 and 2 is increased in fibrotic human liver. *Gastroenterology*. 1996; 110:821-31.
13. Walsh KM, Timms P, Campbell S, MacSween RN, Morris AJ. Plasma levels of matrix metalloproteinase-2 (MMP-2) and tissue inhibitors of metalloproteinases-1 and -2 (TIMP-1 and TIMP-2) as noninvasive markers of liver disease in chronic hepatitis C: comparison using ROC analysis. *Dig Dis Sci*. 1999; 44:624 – 30.
14. Herbst H, Wege T, Milani S, Pellegrini G, Orzechowski HD, Bechstein WO, et al. Tissue inhibitor of metalloproteinase-1 and -2 RNA expression in rat and human liver fibrosis. *Am J Pathol*. 1997; 150:1647 – 59.
15. Ramachandran P, Iredale JP. Reversibility of Liver Fibrosis. *Annals of Hepatology*. 2009; 8:283-91.
16. Fattovich G, Giustina G, Degos F, Tremolda F, Diodati G, Almasio P, et al. Morbidity and mortality in compensated cirrhosis type C: a retrospective follow-up study of 384 patients. *Gastroenterology*. 1997; 112:463–72.

17. Areeba A, Riaz A. Review Article: Understanding the Mechanism of Hepatic Fibrosis and Potential Therapeutic Approaches. *Saudi J Gastroenterol*. 2012;18:155.
18. Tsukamoto H. Redox regulation of cytokine expression in Kupffer cells. *Antioxid Redox Signal*. 2002;4:741–8.
19. Li H, You H, Fan X, Jia J. Hepatic macrophages in liver fibrosis: pathogenesis and potential therapeutic targets. *BMJ Open Gastro*. 2016. 1-4
20. Malhi H, Guicciardi ME, Gores GJ. Hepatocyte Death: A Clear and Present Danger. *Physiol Rev*. 2010 July ; 90(3): 1165–1194
21. Guicciardi ME, Gores GJ. Apoptosis: A Mechanism of Acute and Chronic Liver Injury. *Gut*. 2005;54:1024-33
22. Friedman SL. Molecular regulation of hepatic fibrosis, an integrated cellular response to tissue injury. *J Biol Chem*. 2000;275:2247–50.
23. Jarvelainen H, Sainio A, Koulu M, Wight TN, Penttinen R. Extracellular matrix molecules: potential targets in pharmacotherapy. *Pharmacol Rev*. 2009;61:198-223.
24. Harburger DS, Calderwood DA. Integrin signalling at a glance. *J Cell Sci*. 2009;122:159-63.
25. Rozario T, DeSimone DW. The extracellular matrix in development and morphogenesis: a dynamic view. *Dev Biol*. 2010;341:126-40.
26. Wise SG, Weiss AS. Tropoelastin. *Int J Biochem Cell Biol*. 2009;41:494-7.

27. Callaghan TM, Wilhelm KP. A review of ageing and an examination of clinical methods in the assessment of ageing skin. Part 2, Clinical perspectives and clinical methods in the evaluation of ageing skin. *Int J Cosmet Sci.* 2008;30:323-32.
28. Calleja-Agius J, Muscat-Baron Y, Brincat, MP. Skin Ageing. *Menopause Int.* 2007;13:60-4.
29. Baiocchi A, Montaldo C, Conigliaro A, Grimaldi A, Correani V, Mura F, et al. Extracellular Matrix Molecular Remodeling in Human Liver Fibrosis Evolution. *Plos One.* 2016.
30. Reeves HL, Friedman SL. Activation of hepatic stellate cells: a key issue in liver fibrosis. *Frontiers in Bioscience.* 2002;7:d808–d26.
31. Benyon RC, Arthur MJ. Extracellular matrix degradation and the role of hepatic stellate cells. *Semin Liver Dis.* 2001;21:373-84.
32. Nie QH, Duan GR, Lou XD, Xie YM, Luo H, Zhou YX, et al. Expression of TIMP-1 and TIMP-2 in rats with hepatic fibrosis. *World J Gastroenterol.* 2004; 10:86-90.
33. Pellicorro A, Iredale J.P. Reversibility of liver fibrosis. *Fibrogenesis & Tissue Repair.* 2012;5:2-4.
34. Bataller R, Brenner DA. Liver Fibrosis. *J Clin Invest.* 2005;115:209–18.
35. Poynard T, Moussalli J, Munteanu M. Slow regression of liver fibrosis presumed by repeated biomarkers after virological cure in patients with chronic hepatitis C. *J Hepatol.* 2013;59:675-83

36. Kurzepa J, Czechowska G, Celiński K, Kazmierak W. and Słomka M. Role of MMP-2 and MMP-9 and their natural inhibitors in liver fibrosis, chronic pancreatitis and non-specific inflammatory bowel diseases 2014 [cited 13]. 570-9].
37. Fic P, Zakrocka I, Kurzepa J, Stepulak A. Matrix metalloproteinases and atherosclerosis. *Postepy Hig Med Dosw* (Online). 2011; 65:16-27.
38. Nagase H, Visse R, Murphy G. Structure and function of matrix metalloproteinases and TIMPs. *Cardiovasc Res*. 2006; 69:562-73.
39. Yan HP. Matrix metalloproteinases, the pros and cons, in liver fibrosis. *J Gastroenterol Hepatol*. 2006;21:S88-S91.
40. Liang B, Li Y, Zhao A, Xie F, Guo Z. Clinical Utility of Serum Matrix Metalloproteinase-2 and Tissue Inhibitor of Metalloproteinase-2 Concentrations in The Assessment of Liver Fibrosis due to Chronic Hepatitis B. *The J Int Med Res*. 2012; 40:631-9.
41. Boeker KH, Haberkorn CI, Michels D, Flemming P, Manns MP, Lichtinghagen R. Diagnostic potential of circulating TIMP-1 and MMP-2 as markers of liver fibrosis in patients with chronic hepatitis C. *Clin Chim Acta*. 2002;316:71-81.
42. Baranova A, Lal P, Biredinc A, Younossi ZM. Noninvasive markers for hepatic fibrosis. *BMC Gastroenterology*. 2011;11:91.
43. Kossakowska AE, Edwards DR, Lee SS, Urbanski LS, Stabbler AL, Zhang CL, et al. Altered balance between matrix metalloproteinases and their inhibitors in experimental biliary fibrosis. *Am J Pathol*. 1998: 1895-902.

44. Verma RP, Hansch C. Review Matrix metalloproteinases (MMPs): Chemical–biological functions and (Q)SARs. *Bioorganic & Medicinal Chemistry*. 2007;15: 2223–68.
45. Iredale JP. Tissue inhibitors of metalloproteinases in liver fibrosis. *Int J Biochem Cell Biol*. 1997;29:43-54.
46. Zhang S, Queling L, Xiao J, Lei J, Chai Y, Liu Y, et al. Targeting tissue inhibitor of metalloproteinase 1/2 using a shRNA lentiviral system offers a novel treatment strategy against hepatic fibrosis. *Int J Clin Exp Med*. 2016; 9(12):23329-36.
47. Lu VK, Jong K, Rajasekaran AK, Cloughesy TF, Mischel PS. Research Articles: Upregulation of tissue inhibitor of metalloproteinases (TIMP)-2 promotes matrix metalloproteinase (MMP)-2 activation and cell invasion in a human glioblastoma cell line. *Lab invest*. 2004:1-12.
48. Duarte S, Baber J, Fujii T, Coito AJ. Matrix metalloproteinases in liver injury, repair and fibrosis. *Matrix Biology*. 2015:152-3.
49. Hemann S, Graf J, Roderfeld M, Roeb E. Expression of MMPs and TIMPs in liver fibrosis – a systematic review with special emphasis on anti-fibrotic strategies. *J Hepatol*. 2007; 46:955-75.
50. Junieva P, Yazid N. Pengaruh Pemberian Ekstrak Meniran (*Phyllanthus* sp.) Terhadap Gambaran Mikroskopik Paru Tikus Wistar Yang Diinduksi Karbon Tetraklorida. [Skripsi] Semarang: Fakultas Kedokteran Universitas Diponegoro. 2006.

51. Tappi ES, Lintong P, Loho L. Gambaran Histopatologi Hati Tikus Wistar Yang Diberikan Jus Tomat (*Solanum Lycopersicum*) Pasca Kerusakan Hati Wistar Yang Diinduksi Karbon Tetraklorida (CCl₄). 2013; 1:1126-7.
52. Kumar V CR, Robbins SL. Buku ajar patologi. 7th ed. Jakarta: Penerbit Buku Kedokteran EGC; 2007.
53. Fujii T, Fuch BC, Yamada S, Lauwers GY, Kulu Y, Goodwin JM. Mouse model of carbon tetrachloride induced liver fibrosis: Histopathological changes and expression of CD133 and epidermal growth factor. *BMC Gastroenterology*. 2010;10:1-11.
54. Panjaitan RGP, Handharyani E, Chairul, Masriani, Zakiah Z, Manalu L.W, et al. Pengaruh Pemberian Karbon Tetraklorida terhadap Fungsi Hati dan Ginjal. *Kesehatan*. 2007;11:11-6.
55. Jeon TI, Hwang SG, Park NG, Jung YR, Shin SI, Choi SD, et al. Antioxidative effect of chitosan on chronic carbon tetrachlorida induced hepatic injury in rats. *Toxicology*. 2003;187:67-73.
56. Chattopadhyay I, Kaushik B, Bandyopadhyay U, Banerjee RK. Turmeric and curcumin: Biological actions and medicinal applications. *Curr Sci*. 2004;87:44-50.
57. Yao Q, Xu B, Wang J, Liu HC, Zhang Sc and Tu C. Inhibition by curcumin of multiple sites of the transforming growth factor-beta1 signalling pathway ameliorates the progression of liver fibrosis induced by carbon tetrachloride in rats. *BMC Complementary and Alternative Medicine*. 2012;12:156.

58. Back N, Cohen IR, Kritchevsky D, Lajtha A, Paoletti R. The Molecular Targets and Therapeutic Uses of Curcumin in Health and Disease. 2007. In: ADVANCES IN EXPERIMENTAL MEDICINE AND BIOLOGY [Internet]. Springer Science and Business Media.
59. Shu JC, He Y, Lv X, Zhao JR, Zhao J, Shen Y, et al. Effect of curcumin on the proliferation and apoptosis of hepatic stellate cells. *Braz J Med Biol Res.* 2009;42(12):1177.
60. Xu J, Fu Y, Chen A. Activation of peroxisome proliferator-activated receptor-gamma contributes to the inhibitory effects of curcumin on rat hepatic stellate cell growth. *Am J Physiol Gastrointest Liver Physiol.* 2003;285:G20-30.
61. Mackenzie GG, Quiesser N, Wolfson ML, Fraga CG, Adamo AM, Oteiza PI. Curcumin induces cell-arrest and apoptosis in association with the inhibition of constitutively active NF-kappaB and STAT3 pathways in Hodgkin's lymphoma cells. *Int J Cancer.* 2008;123:56-65.
62. Shankar S, Srivastava RK. Bax and Bak genes are essential for maximum apoptotic response by curcumin, a polyphenolic compound and cancer chemopreventive agent derived from turmeric, *Curcuma longa*. *Carcinogenesis.* 2007;28:1277-86.
63. He YJ, Kuchta K, Lv X, Lin Y, Ye GR, Liu XY, et al. Curcumin, the main active constituent of turmeric (*Curcuma longa* L.), induces apoptosis in hepatic stellate cells by modulating the abundance of apoptosis-related growth factors. *Z. Naturforsch.* 2015; 70:281–5.

64. Zheng S, Chen A. Curcumin suppresses the expression of extracellular matrix genes in activated hepatic stellate cells by inhibiting gene expression of connective tissue growth factor. *Am J Physiol Gastrointest Liver Physiol*. 2006; 290; G883-G893.
65. Kurschat P, Zigrino P, Nischt R, Breitkopf K, Steurer P, Klein CE, et al. Tissue inhibitor of matrix metalloproteinase-2 regulates matrix metalloproteinase-2 activation by modulation of membrane-type 1 matrix metalloproteinase activity in high and low invasive melanoma cell lines. *J Biol Chem*. 1999;274:21056–62
66. Nugraheni, A., Supriono. Peran Lama Pemberian Kurkumin Terhadap Kadar TGF- β 1 Serum, Jaringan Hati dan Ekspresi TGF- β 1 Jaringan Hati Pada Tikus Model Fibrosis Hati Akibat Induksi Karbon Tetraklorida. Fakultas Kedokteran Universitas Brawijaya Malang. 2017.
67. Lee GP, Jeong WI, Jeong DH, Do SH, Kim TH, Jeong K. Diagnostic evaluation of carbon tetrachloride-induced rat hepatic cirrhosis model. *Anticancer Research*. 2005;25(2A):1029-38.
68. Ismail MH, Pinzani M. Reversal of liver fibrosis. *Saudi J Gastroenterol*. 2009;15(1):72.
69. Friedman SL. Molecular regulation of hepatic fibrosis, an integrated cellular response to tissue injury. *J Biol Chem*. 2000; 275: 2247–2250.
70. Issa R, Williams E, Trim N, Kenall T, Arthur MJP, Reichen J, et al. Apoptosis of hepatic stellate cells: involvement in resolution of biliary

fibrosis and regulation by soluble growth factors. *Gut*. 2001;48:548–557.

- 71.Bruck R, Ashkenazi M, Weiss S, Goldiner I, Shapiro H, Aeed H, et al. Prevention of liver cirrhosis in rats by curcumin. *Liver International*. 2007;27(3):373-83.
- 72.Prasad S, Tyagi AK, Aggarwal BB. Recent developments in delivery, bioavailability, absorption and metabolism of curcumin: the golden pigment from golden spice. *Cancer research and treatment: official journal of Korean Cancer Association*. 2014;46(1):2-18.
- 73.Rajasekaran SA. Therapeutic potential of curcumin in gastrointestinal diseases. *World J Gastrointest Pathophysiol*. 2011;2(1):1-14.
- 74.Madusanka N, de Silva KMN, Amaratunga G. A curcumin activated carboxymethyl cellulose–montmorillonite clay nanocomposite having enhanced curcumin release in aqueous media. *Carbohydrate polymers*. 2015;134:695-9.